Claims

What is claimed is:

1. A near full duplex portable handset speakerphone comprising:
   a. a microprocessor;
   b. a hands-free receive register connected to the microprocessor;
   c. a hands-free transmit register connected to the microprocessor;
   d. a ROM having a speakerphone operation algorithm, the ROM connected to the microprocessor;
   e. a first analog-to-digital converter connected to the hands-free receive register;
   f. a second analog-to-digital converter connected to the hands-free transmit register;
   g. a first programmable digital attenuator connected to the microprocessor and to a speaker; and
   h. a second programmable digital attenuator connected to the microprocessor and to a microphone,
   wherein near full duplex communication is achieved without digital signal processing.

2. A speakerphone system including:
   a. a near full duplex portable handset comprising:
      i. an integrated circuit controller chip comprising a microprocessor, an embedded hands-free receive register connected to the microprocessor, an embedded hands-free transmit register connected to the microprocessor, a pre-amplifier connected to the microprocessor; and a codec having first and second programmable digital attenuators, the first programmable digital attenuator connected to the microprocessor, and the second programmable digital attenuator connected to the microprocessor, to the embedded hands-free transmit register, and to the pre-amplifier,
   wherein near full duplex communication is achieved without digital signal processing.

3. The speakerphone system of claim 2, wherein the portable handset further comprises:
   a. a ROM having a speakerphone algorithm, the ROM connected to the microprocessor;
   b. a first programmable digital attenuator connected to the first programmable digital attenuator;
   c. a speaker connected to the first programmable digital attenuator;
   d. a microphone connected to a second programmable digital attenuator;
   e. the second programmable digital attenuator connected to the pre-amplifier; and

8   f.   a radio frequency interface connected to the first and second programmable digital

9   attenuators.

1   4.   The speakerphone system of claim 2, further including a base station comprising:

2   a.   an integrated circuit controller chip comprising a codec;

3   b.   a telephone line interface; and

4   c.   a radio frequency interface.

1   5.   The speakerphone system of claim 3, further including a base station comprising:

2   a.   an integrated circuit controller chip comprising a codec;

3   b.   a telephone line interface; and

4   c.   a radio frequency interface.

1   6.   A near full duplex speakerphone system comprising:

2   a.   a portable handset comprising:

3   i.   an integrated circuit controller chip comprising a microprocessor, an embedded

4   hands-free receive register connected to the microprocessor, an embedded

5   hands-free transmit register connected to the microprocessor, a pre-amplifier

6   connected to the microprocessor; and a codec having first and second

7   programmable digital attenuators, the first programmable digital attenuator

8   connected to the microprocessor, and the second programmable digital

9   attenuator connected to the microprocessor, to the embedded hands-free

10   transmit register, and to the pre-amplifier;

11   ii.   a ROM having a speakerphone algorithm, the ROM connected to the

12   microprocessor;

13   iii.   a first programmable digital attenuator connected to the first programmable

14   digital attenuator;

15   iv.   a speaker connected to the first programmable digital attenuator;

16   v.   a microphone connected to a second programmable digital attenuator;

17   vi.   the second programmable digital attenuator connected to the pre-amplifier;

18   vii.   a radio frequency interface connected to the first and second programmable

19   digital attenuators; and

20   b.   a base station comprising:

21   i.   an integrated circuit controller chip comprising a codec;

22   ii.   a telephone line interface; and

23   iii.   a radio frequency interface,

24   wherein near full duplex communication is achieved without digital signal processing.

7. 1 A method of operating a ~~near-full~~ duplex speakerphone by a microprocessor in a portable
    2 handset, without digital signal processing, the handset further including a ROM containing
    3 a stored operation algorithm for directing the microprocessor, hands-free transmit and receive
    4 registers, a microphone, a speaker, a first speech path between the microphone and a radio
    5 frequency interface, and a second speech path between the speaker and the radio frequency
    6 interface, the method comprising the steps of:
    7   a.   directing the reading of the hands-free registers, and determining the peak volume
    8   levels of both speech paths; and
    9   b.   digitally adjusting the microphone and speaker gains in relation to the peak volume
    10   levels.

8. 1 The method of claim 7, wherein the stored operation algorithm uses software timers and peak
    2 detection.

9. 1 The method of claim 8, wherein a software timer generates a hardware interrupt to the
    2 microprocessor on every speech frame so that one of the hands-free registers can be read by
    3 a software peak detector.